# PATHFINDER

An informal newsletter published for the GPS user community by PM GPS. Information presented is based on published and submitted news items of interest to the general user. Widest dissemination and reproduction is encouraged. Newsworthy items are solicited for inclusion. Editor Mr. Don Mulligan at PM GPS, PM NAV SYS, Ft Monmouth NJ DSN 992-6137 or (732) 532-6137 or email: Donald.Mulligan1@us.army.mil

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# AN/PSN-13 DAGR Fielding Continues!

## First Unit Equipped is 2nd BDE, 82nd Airborne Division

## PM's Corner

Greetings!
We began fielding the Defense Advanced GPS Receiver (DAGR) in November 2004 and First Unit Equipped (FUE) honors went to the 2nd BDE, 82nd Airborne Division. As of today, over 4,000 DAGR have been fielded to Army units. In addition to the state-of-the-art GPS receiver, DAGR fielding includes various accessories and New Equipment Training (NET) to kick-start the unit's operational skills with DAGR.

The DAGR fielding schedule is flexible to accommodate today's high OPTEMPO. Our objective is to deliver DAGR to high priority units as identified by Headquarters Army. Fielding will continue over the next few years at a pace set by the availability of funds.

As explained in this issue, DAGR fielding does not mean the end of PLGR so don't jump to any conclusions about unit options for the disposal of 'excess' PLGRs!

Questions? Contact me or my staff via the "Contact Box" elsewhere in this issue.

***Skip Harborth, LTC, SC***

***Product Manager, GPS***

***The first order of business for DAGR New Equipment Training (NET) is classroom work as seen here at Camp Shelby MS, followed by practical exercises to develop confidence in operating the state-of-the-art receiver.***

## PLGR + DAGR = MIL GPS

DAGR "displaces" not "replaces" the veteran AN/PSN-11 and AN/PSN-11(V)1 Precision Lightweight GPS Receiver (PLGR) which entered service in 1994. What is the difference between "displace and replace" and does it mean anything at the unit level? "Yes" to both questions as explained in this article.

Usually, when a new device replaces an older device that does the same thing, the MTOE or TDA, (the documents that prescribe Unit Equipment Authorizations) are updated by replacing the NSN of the old item with the NSN of the new item in the Property Book.

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***REMEMBER! PPS is not just GPS, It's SECURE GPS!***

# PLGR + DAGR = MIL GPS

*(Cont'd from Page1)*

Once the new equipment is issued, the old equipment is no longer authorized in the unit and should be turned-in for disposal or reutilization.

That is NOT THE CASE with GPS receivers in the Army because we are not funded to purchase enough DAGRs to replace every PLGR. The solution is to allow units to operate a mixture of PLGR and DAGR receivers that adds up to the total number of "handheld GPS receivers" authorized by MTOE/ TDA. The line item in the property book should accommodate either the PLGR or DAGR NSN as a suitable device.

***"Only use a PPS-capable GPS receiver for missions affecting life safety".***

***"A combination of PLGR and DAGR is a compromise to make the most of available PPS-rated GPS receivers."***

This solution allows us to spread the available DAGRs over a larger number of units. The number of PLGR retained versus new DAGR issued may vary by unit and is worked during pre-fielding meetings between PM GPS and the gaining command.

Since the PLGR remains in service, it is not surplus and will not be subject to disposal. Here is an important note: All PPS-capable GPS receivers including PLGR and DAGR are 'high value, pilferable' items because they contain a COMSEC device. The policy of the Defense Reutilization Management Office (DRMO) is to not accept any equipment containing COMSEC for disposal. (See the separate article about DRMO in this issue).

We recognize that the retention of two versions of GPS receivers increases the unit's logistical burden since they use different batteries, accessories and technical manuals. Some soldiers will have to maintain proficiency with both PLGR and DAGR with different operating procedures, features and screen displays. If funds were not an issue, it would be simpler to replace all PLGR with DAGR but that solution is not 'in the cards'.

In defense of PLGR, it may not be state-of-the-art but it is not obsolete. PLGR is a proven reliable design and when installed to a vehicle where it's weight and size are less critical than for dismounted operators, the PLGR provides effective military-rated GPS so why fix it if it's not broke?

Keeping PLGR where it is already installed to host vehicles frees up more DAGRs to units where dismounted troops will appreciate its smaller size and weight. Although the PLGR and DAGR are interoperable and both meet the requirement for a PPS-capable "Ground Tactical Receiver", they are two different products. That is only natural since GPS receiver technology has advanced in the 10 years since PLGR was designed.

How do they differ? The differences were laid out in the October 2003 issue of PATHFINDER which can be obtained from the PM GPS website. In a nutshell, DAGR does everything the PLGR does, but DAGR uses different menus and screen displays and incorporates new features such as a digital map display that is not available in PLGR. A difference that is transparent to the general user is the internal COMSEC device. PLGR uses the older PPSSM device while DAGR uses the new SAASM device. These are not user serviceable items. Just be aware that an internal COMSEC device sets the military GPS receiver apart from commercial receivers.

We remain committed to PLGR. See the good news about the PLGR Deferred Maintenance Program elsewhere in this issue. The bottom line is that "PLGR + DAGR = Mil GPS" maximizes the use of PPS-rated GPS receivers by authorized users.

*Fielding: Ed McAuley at (732) 532-6136, DSN 992-6136.*

*Logistics: Suzanne Reinhardt-Smith at (732) 532-5758, DSN 992-5758.*

## *Military-rated GPS:*

### *Its more than Olive Drab Green Paint!*

You've read articles that mention "military-rated" GPS versus commercial GPS. "Military-rated" means a GPS receiver is equipped to receive the "Precise Positioning Service" (PPS) signal. The official description for "military-rated" is "PPS-capable". It's more than OD green (or desert sand) paint.

The value of a PPS-capable receiver is best explained by comparing its performance to that of a commercial GPS receiver which can only receive the Standard Positioning Service or SPS signal. Only PPS-capable receivers contain a Communication Security (COMSEC) device which provides access to the PPS signal. Since they don't have COMSEC, commercial GPS receivers cannot access the PPS signal.

Okay, so what's in the PPS signal that makes a PPS-capable receiver perform so much better? We can't go into detail in this unclassified document but we can tell you the bottom line for the average GPS user: Once your PPS-capable GPS receiver has accessed the PPS signal, it will deliver better accuracy and have greater protection against spoofing and jamming of the GPS signal than an SPS receiver. This is a crucial advantage especially under an electromagnetically challenged environment.

**Reliable battlefield performance** is why PPS service is reserved exclusively for military and other authorized users.

Says who? Office of the Secretary of Defense (OSD) policy mandates only PPS-capable GPS receivers are authorized for use in combat and combat support operations. If you need to see the policy, contact PM GPS. The reverse of this OSD policy is also true: Commercial GPS receivers operating on the SPS signal are not authorized for military missions because they lack signal security and are susceptible to hostile attempts to jam and or spoof the GPS signal. Read the articles in the April 2004 and October 2004 Pathfinder for more information about PPS versus SPS, jamming and countermeasures. Those issues are available at the GPS website.

Think of PPS as "Secure GPS" and only use PPS-capable GPS receivers in the same way you would only use 'secure radio communications" for combat operations.

What if we already bought commercial GPS? If you use them, you are making the dicey assumption that your Area of Operations is clear of hostile efforts to jam or spoof GPS signals. We can't physically prevent anyone from using commercial GPS and there is no maintenance support available. Here's what we have heard from troops in deployed locations:

"We like some of the 'user-friendly' features found in commercial GPS receivers, but we only use PPS-rated military receivers on missions where accuracy counts and lives could be at stake".

*Bill Pohlmann at (732) 532-6131 or DSN 992-6131*

### A Mix of Receivers!

The Total Army requirement for handheld GPS receivers now exceeds 156,000 units.

Headquarters Army has authorized a mixture of PLGR and DAGR to fill this requirement.

Questions about authorizations of PLGR and DAGR for a particular unit should be directed to Headquarters Army G3/G8 who controls DAGR fielding priorities.

Questions about the DAGR fielding scheduled for your unit should be directed to your Installation Force Integration Readiness Office or PM GPS at Fort Monmouth NJ.

### "Other Features" of Military GPS

Besides PPS-capability, Military-rated GPS receivers have other features including:

- A tough durable case.
- Strong resistance to water and dust.
- Able to operate in extreme temperatures.
- Can be operated with MOPP gloves.
- Extensive testing under hostile conditions to prove its reliability under duress.
- Effective Maintenance program in place.

## DAGR Reprogramming: MWO 11-5820-1172-20-1

Does it seem strange that a new product like DAGR needs reprogramming in its first year of service? Well, there is a good reason. Here is the situation:

PM GPS is maximizing the utility of GPS in support of combat mission operations. This includes making DAGR interoperable with other weapons systems and technologies. One of the newer technologies used in the military is Laser Range Finding (LRF). A new interface that supports the latest LRF products is now being added to DAGR.

PM GPS did not want to delay the fielding of DAGR to complete tests of the LRF interface but now that the tests are done and the LRF software has a clean bill of health, we are rolling that feature into all new DAGRs and we now offer it to upgrade previously fielded DAGR via field reprogramming.

Similarly, PM GPS is accommodating rapid developments in the use of digital maps to support combat operations. Again, it wasn't part of the original DAGR design but as you read this article, PM GPS and a team of technical experts are expediting reliability and safety testing in order to introduce a DAGR mapping module. The bottom line is that DAGR field reprogramming will allow you to load the latest version software to make the most of GPS in support of mission operations.

***In addition to your PC, you will need the new DAGR software and the DAGR-to-PC cable. You can download the software from the CECOM RDIT site or request a copy on disk from your MWO Coordinator.***

The mechanics of loading new DAGR software are spelled out in the MWO listed in the title above, also available as TCTO **TO 31R4-2PSN13-501**. Field units will be able to download the software from the CECOM RDIT website and then transfer the data from a PC to DAGR. Note: PM GPS is not issuing a "reprogramming kit" as we did with PLGR reprogramming in the past. That is because the only thing you need in addition to the software is the DAGR to PC Cable P/N 987-5012-001, NSN 5995-01-521-3198. (NOTE: This cable is provided on a "1 for every 10 DAGRs" basis during Army fieldings.

Get the TCTO/ MWO from the CECOM RDIT website. The software will also be distributed through the usual MWO channels. You can always check the GPS website for the latest status of DAGR software availability.

*Software Questions: Frank Rowe DSN 468-9511*

*Reprogramming Procedures: Bill Pohlmann at DSN 992-6131 or William Burnette at DSN 468-1109*

## PLGR Reprogramming: MWO 11-5825-291-30-4

An MWO/TCTO to reprogram PLGR was distributed in 2003. It was discussed in the July 2004 issue of Pathfinder which is available on-line at the PM GPS website. The current version software for PLGR is:

**Standard (tan) 613-9854-005**

**Enhanced (green) 613-9868-008**

MWO 11-5825-291-30-4 (Feb 2003) is available at your MWO Coordinator or at the CECOM RDIT website. If you don't have the right cable and power supply on hand, you might need to borrow a reprogramming Kit # 5825K3118012ANS. For assistance with reprogramming contact us.

**See July 2004 issue online for more PLGR Reprogramming information!**

*Bill Pohlmann at DSN 992-6131 or William Burnette at DSN 468-9511.*

## PLGR Doesn't Work in the Alley!

PM GPS has heard from troops operating in Middle Eastern urban environments about a PLGR satellite tracking problem. Based on conversations with soldiers, the cause of the problem appears to be maintaining clear access to GPS signals. This is a known weakness of the GPS system and it requires the user to compensate or recover from intermittent loss of satellite tracking. A patrol moving through narrow streets and through buildings is likely to experience a temporary loss of satellite signal. This is the 'urban canyon' effect and is similar to what the TM calls "dense foliage".

The PLGR was designed to compensate for brief signal interference to a point and in many cases, it will be able to maintain effective satellite contact. However, if PLGR is set to the CONTINUOUS mode and you are operating in a low signal environment for an extended period (15 minutes or longer), the PLGR may fall into a processing loop where it can't access satellites even when you get back into an area with clear sky access. Shaking the PLGR doesn't help.

First, try setting the PLGR to STANDBY mode then switch back to the previous tracking mode to re-acquire satellites. If that doesn't work, cycle power (turn the PLGR off then on). If that doesn't work, remove the main power batteries and reinsert them to "wake up" the PLGR but this approach will dump your memory including any waypoints. Check out Section 6.1.2.4. Antenna masking of the PLGR TM 11-5825-291-13.

*POC Bill Pohlmann at DSN 992-6131*

## PLGR Come Home!

PM GPS has a request for every agency that obtained PLGR by loan or other means for research, development, test or integration work over the years: Please contact us immediately to advise if you still need those PLGRs or if you can **return them** to active Army stock. If the PLGRs are under-utilized or no longer needed, we want them back. Even with the arrival of the DAGR, we need every available PLGR to sustain deployed forces!

*Jim Buggy at (732) 532-4733, DSN 992-4733 or james.buggy@us.army.mil*

***Standard and enhanced PLGR will soldier on for several more years. Even when retirement comes, they will NOT be authorized for disposal through DRMO under any circumstances.***

## GPS SATELLITES EVENTUALLY DIE!

GPS SVN-17, the oldest GPS satellite on orbit was recently decommissioned by 2nd Space Operations, USAF after providing over 15 years of service.

After a period of operation that far exceeded design specifications, Space Operations "turned-off" the satellite and used the GPS signal to inform receivers that SVN-17 was no longer available.

SVN-17 will soon be directed to fire it's thrusters one last time to push the satellite into a lower orbit. The satellite will experience the ultimate demilitarization and disposal process when it burns up upon re-entry to the earth's atmosphere.

The slot freed up by decommissioning SVN-17 will be assigned to a satellite planned for launch later this year. At that time a new 'bird' will rise from the ashes like the Phoenix bird of legend to take the place of SVN-17 to support worldwide GPS users.

Once Space Operations confirms the new satellite is fully operational, a message will be sent to all GPS receivers via the almanac data in the GPS signal to report the new satellite is in service.

## Update on DAGR Manuals


The DAGR **TM 11-5820-1172-13** was recently revised to include information about new DAGR features that come with the new software. The new edition TM can be identified by the publication date of **1 March 2005**.

If you already received DAGR TMs with the initial date of 6 June 2004, requisition the new version through your publications officer.

The DAGR Operators Pocket Guide has also been updated. The new edition of **TB 11-5820-1172-10** is dated **1 March 2005**. Again, requisition the new version through publications channels.

*Susan Vernoski, Ft Monmouth DSN 987-5899*

## PLGR and Deferred Maintenance

Over the last decade, PM GPS quickly repaired and returned damaged PLGRs to field users using the extended warranty and Army depot funds for repairs not covered by the warranty.

The Deferred Maintenance program was established in 2001 to deal with a lack of Army depot funds. Some PLGRs were set aside to await repair funds. Available repair funds were prioritized to support units above a cut-off point on the Army Order of Precedence priority list. Owning units that fell below the cut-off point were given a notification letter with instructions to submit a requisition with a special code. This enables the release of replacement PLGR as repair funds became available.

We are pleased to report the situation has improved and PM GPS is working to eliminate the remaining backlog of PLGRs in Deferred Maintenance.

This is good news because the PLGR will 'soldier on' for years, providing a reliable source of PPS-capable GPS data.

Inevitably, a certain number of PLGR will fail. Repair options for the field user are unchanged: Disregard the warranty expiration label and return the PLGR to Rockwell marked for warranty repair. Procedures are posted at the GPS website.

If your PLGR warranty has expired, a replacement will still be provided. NOTE: If your PLGR was battle damaged and consists of a bag of parts, we need a copy of the signed Report of Survey or a copy of some other loss declaration before we can ship a replacement.

*Suzanne Reinhardt-Smith at DSN 992-5758.*
*Diana Wright at DSN 468-5096.*

## Demilitarization and DRMS

The Defense Reutilization Management Service (DRMS) operates Defense Reutilization Management Offices (DRMO) around the globe to receive excess or obsolete property from military units. Technical and Item Managers such as PM GPS provide advice to DRMS on how to dispose of the equipment they sponsor or manage.

This advice helps to safeguard security components and address potential environmental or safety hazards that might not be evident to someone who is less familiar with the equipment. DRMS assigns a Demilitarization (DEMIL) code to each NSN to provide field units with disposal guidance.

In the case of PPS-capable GPS receivers, DRMS policy is to NOT ACCEPT any such equipment for demilitarization or disposal due to the COMSEC component. DRMS has assigned a DEMIL Code F to GPS receivers which states "Disposition Instructions are provided by the Item/Technical manager".

PM GPS recently coordinated with item/technical managers in each service to be sure DRMS has current disposition instructions for PPS-capable GPS receivers. Information specific to each identifies the vendor or depot that is certified by the National Security Agency (NSA) to "demil and dispose" PPS-capable GPS receivers.

Only the NSA-authorized vendors or depot have the legal authority to dispose of PPS-capable GPS receivers. Local disposal or destruction of PPS-

capable GPS receivers is never authorized. Anyone purchasing PPS-capable GPS receivers even it is based on someone else's mistake, is subject to prosecution under federal law.

*Don Mulligan at DSN 992-6137.*

## DAGR Battery Packs - A Tight Fit!

***Above: When removing the DAGR battery pack, grasp the pack firmly at BOTH top corners because there are latches at top right and top left corners! You should hear two snaps, indicating that both corner snaps have released. Below: The battery pack should now slip out of the DAGR case without binding. So listen for two snaps!***

A frequent observation at DAGR NET classes is that the 'snap-on' AA battery pack is a tight fit, maybe too tight? It was designed that way for good reason. You don't want the battery pack popping loose while on a mission and the tight fit provides a high degree of protection from water intrusion.

The TM explains how to open the battery pack. NET instructors advise you to hold the DAGR upside down with the battery pack facing you and grasping the bottom of the battery pack cover (now at the top of your hand), give it a good tug (See photos at left). Over time as you remove and replace the battery pack, the seal may soften a bit letting the process go easier. Resist the urge to pry the battery pack off with a screw driver because that risks damaging the lip of the DAGR case or the battery pack. That could result in loss of integrity for the water resistant seal and an unserviceable DAGR. The tight fit protects your batteries from contamination and accidental disconnects.

*Jerry Skipper, NET: Jerry.Skipper@us.army.mil or*

*Bill Hardy at DSN 992-4769.*

## DAGR New Equipment Training (NET)

***Above: During NET at Camp Shelby MS, soldiers gather around Vennis Reid, GPS NET Instructor before heading off for field exercises to practice their operational skills with DAGR. Below: a couple of soldiers "run the menus" during the classroom portion of NET course at Camp Shelby.***

## How to Contact PM GPS

Product Management Office (PMO) Los Angeles CA

LTC Skip Harborth, PM GPS
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*Who to Call?*

For GPS policy, platform integration and new product information, call the PMO.

For equipment authorization, maintenance status, fielding, and NET, call the MFO.

For sustainment issues including software, supply, technical publications, accessories, host vehicle installations, call the GFO.

Or contact one of our Help Lines:

***Willie Jackson in Georgia at DSN 468-3518 or CML (478) 926-3518***
***Willie.Jackson@robins.af.mil***

***Jim Buggy in NJ at DSN 992-4733 or CML (732) 532-4733***
***James.Buggy@mail1.monmouth.army.mil.***

***Visit the PM GPS WEBSITE:***
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